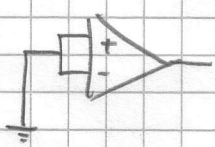


Op Amps III

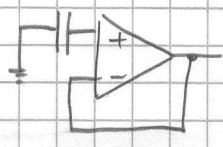
Departures From the ideal

- inputs do draw (or source) a little current
- inputs are not held at precisely equal voltages

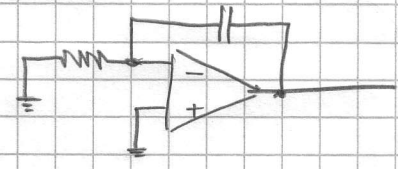
These circuits saturate (ideally they should not):



(+) & (-) not exactly equal...



(+) is floating... eventually charge will build up from non-zero (+) current..



no negative feedback at DC is correct for (+) - (-) offset...

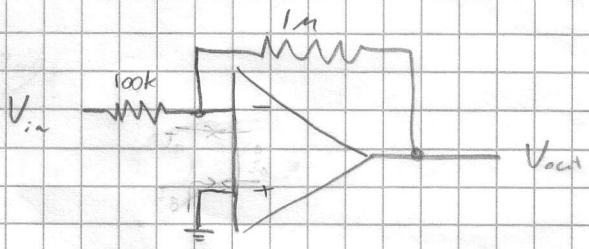
Op Amp Errors

- Voltage offset: V_{os} ← difference in (+) & (-) even when the same voltage is applied to both inputs. (typically $< 1mV$)

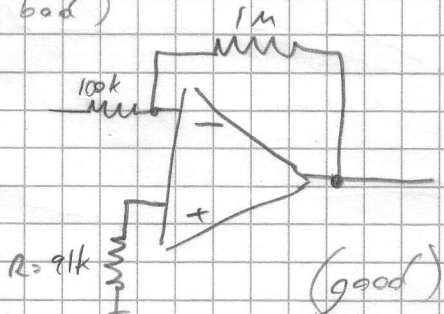
SOLUTION: TRIM, USE GOOD OP-AMP, OR CIRCUIT

- Bias current: I_B or I_{bias} ← DC bias current flowing in/out of the inputs (typically $< 50pA$)

e.g



(bad)

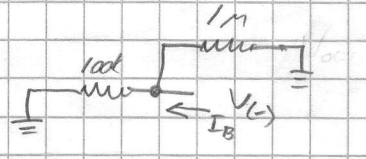


(good)

W/out:

$V_{in} = 0$

$V_{out} = 0$



$I_B (100k || 1M) = V_{(+)}$

$V_{(+)} = V_{(-)} = I_B R$

$R = (100k || 1M)$

SOLUTION:

BALANCE RESISTIVE PATHS